Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Advanced Methods to Target and Eliminate Unlawful Robocalls	)	CG Docket No. 17-59
	)	
	)	
Call Authentication Trust Anchor	)	WC Docket No. 17-97

REPLY COMMENTS OF
TELNYX LLC

Telnyx LLC ("Telnyx")[1] respectfully submits these reply comments in further response to the Third Further Notice of Proposed Rulemaking[2] ("Third Further Notice") in the above-referenced dockets.

Telnyx reiterates its comments submitted on July 24, 2019 to the Federal Communications Commission (the "Commission" or "FCC") in response to the Third Further Notice, and echoes concerns expressed by others both about legitimate calls being blocked upon implementation of SHAKEN/STIR, as well as the need for IP Interconnection to ensure SHAKEN/STIR's efficacy. Telnyx respectfully submits the attached annex ("Annex I") outlining a proposal to modestly revise the SHAKEN/STIR framework to remedy these concerns. Telnyx further submits these comments in illustration of its concern and the need for such remediation.

I. SHAKEN/STIR must be modified to address the least-cost-routing ("LCR") and enterprise business use cases so legitimate calls are not blocked and competition is not stifled.

SHAKEN/STIR should be amended so it does not disadvantage competitive providers. Telnyx is concerned that SHAKEN/STIR (as currently constituted) will significantly burden service providers and enterprises that rely on LCR. These concerns have been echoed within industry groups such as the ATIS/SIP Forum IP-NNI Task Force which also agree that SHAKEN/STIR may ultimately harm the end user and block legitimate use cases - many of which originate from enterprise businesses - such as appointment reminders, school related notifications and community emergency alerts. These use cases have the potential to be blocked because they share call patterns with illegal robocalls and spam. Ultimately, it is essential and in Telnyx's (and the end user's) best interests to address illegal robocalls. However, Telnyx urges the Commission to review the proposed solution to ensure that SHAKEN/STIR does not prejudice competitive providers and enterprise business use cases.

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[1] Telnyx is an interconnected, voice over internet protocol ("VoIP") provider with direct access to numbering resources pursuant to license from the Commission. Telnyx delivers voice, messaging and other telecommunications and telecommunications-related services via web-based platform and API to power global applications and next-generation communications companies.

[2] *See Advanced Methods to Target and Eliminate Unlawful Robocalls; Call Authentication Trust Anchor,* CG Docket No. 17-59, WC Docket No. 17-97, Declaratory Ruling and Third Further Notice of Proposed Rulemaking, FCC 19- 51 (rel. June 7, 2019) (*Call Blocking Declaratory Ruling & Third Further Notice*).

Telnyx believes that the annexed proposed refinements to the SHAKEN/STIR solution[3], which allow enterprises to obtain direct certificate authorization from the Secure Telephone Identity Policy Administrator ("STI-PA"), would both assist with this legitimate-call-blocking issue, as well as create greater transparency and accountability regarding parties in control of end-user access and experience, in turn also further assisting with the need to protect against illegal robocalling. As outlined in Annex I, enterprise businesses nearer to the end user would themselves be obligated to attest to having the authority to use the number from which they are originating the call. Enabling authentication to originate further downstream will facilitate more detailed robocalling blocking analytics (decreasing the amount of unintentional blocking). Treating enterprise businesses and upstream providers equally in the SHAKEN-STIR framework gives everyone the incentive to verify the traffic and use cases on their network, creating a fairer and more trusted framework overall.

Telnyx respectfully requests that the Commission review Annex I (attached hereto) for further detail on this certificate proposal. Telnyx has also presented this proposed SHAKEN/STIR refinement to the ATIS/SIP Forum IP-NNI Task Force and anticipates further discussion at upcoming teleconferences and face-to-face meetings.

II. SHAKEN/STIR will not be effective unless pursued in parallel with IP Interconnection.

SHAKEN/STIR will not be effective in the absence of robust IP Interconnection. Telnyx concurs with other commenters about the potential pitfalls associated with SHAKEN/STIR due to the lack of availability of IP Interconnections.[4] Many of these IP Interconnections, specifically those with large incumbents, are commercially inaccessible to smaller providers due to the exorbitant rates charged by these large incumbents. By way of example, Telnyx has been quoted required minimum commitments of 100 million monthly minutes from a large incumbent simply to open discussions about an IP interconnection. This barrier to entry is unconscionable, anticompetitive and an early indicator of problems to come. SHAKEN/STIR will only benefit consumers if a majority of calls originate and terminate on the IP network. However, all licensed interconnected VoIP providers under FCC Order 15-70, like Telnyx, must have backwards compatibility to the PSTN. Furthermore, many of these VoIP providers are unaware as to how their downstream vendors interconnect with larger incumbents. As an example, currently, it is possible that Telnyx's calls, even though originating on an interconnected VoIP provider's network, could be terminated via TDM and lose all SHAKEN/STIR metadata. Since many smaller, competitive and technologically innovative VoIP providers such as Telnyx are relied upon by enterprise businesses to provide underlying carrier services, these providers are highly incentivized to ensure enterprise use cases remain on IP networks so they can be attested to appropriately under SHAKEN/STIR (and therefore receive the benefit of fully certificated and uninterrupted service). Accordingly, Telnyx is dedicating many resources to implement SHAKEN/STIR internally, and has the utmost interest in ensuring that reputational backlash and commercial friction resulting from unchecked robocalling is extinguished via effective and tailored industry solutions, and that legitimate and societally

[3] *See* Annex I, Telnyx's *Enterprise Certificates* proposal.

[4] *See e.g.*, Comments of The Rural Broadband Association ("NTCA"), CG Docket No. 17-49, WC Docket No. 17-79 at 4 (filed July 24, 2019) (expressing concern that smaller carriers, like "RLECs in need of IP Interconnection agreements to implement SHAKEN/STIR could find themselves at the mercy of larger providers dictating new interconnection and transport terms, and the leverage larger carriers already have today will increase").

beneficial use cases reliant on forward-looking technologies built by next generation providers is not stifled in the process.

Once again, Telnyx thanks the Commission for all of its ongoing efforts to combat illegal robocalling. Telnyx greatly appreciates the Commission's time in considering our foregoing concerns. Pursuant to the Commission's rules, Telnyx is filing this notice electronically in the above-referenced dockets. Should you have any further questions or comments, please do not hesitate to contact us.

Respectfully submitted,

/s/ David Casem

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August 23, 2019

Enterprise Certificates

Presented by ***Ramon Torres***

Agenda

1. Workflows: Delegate Certificates
2. Overview of Enterprise Certificates
3. Scenarios
4. Advantages of Enterprise Certificates

Workflows: Delegate Certificates

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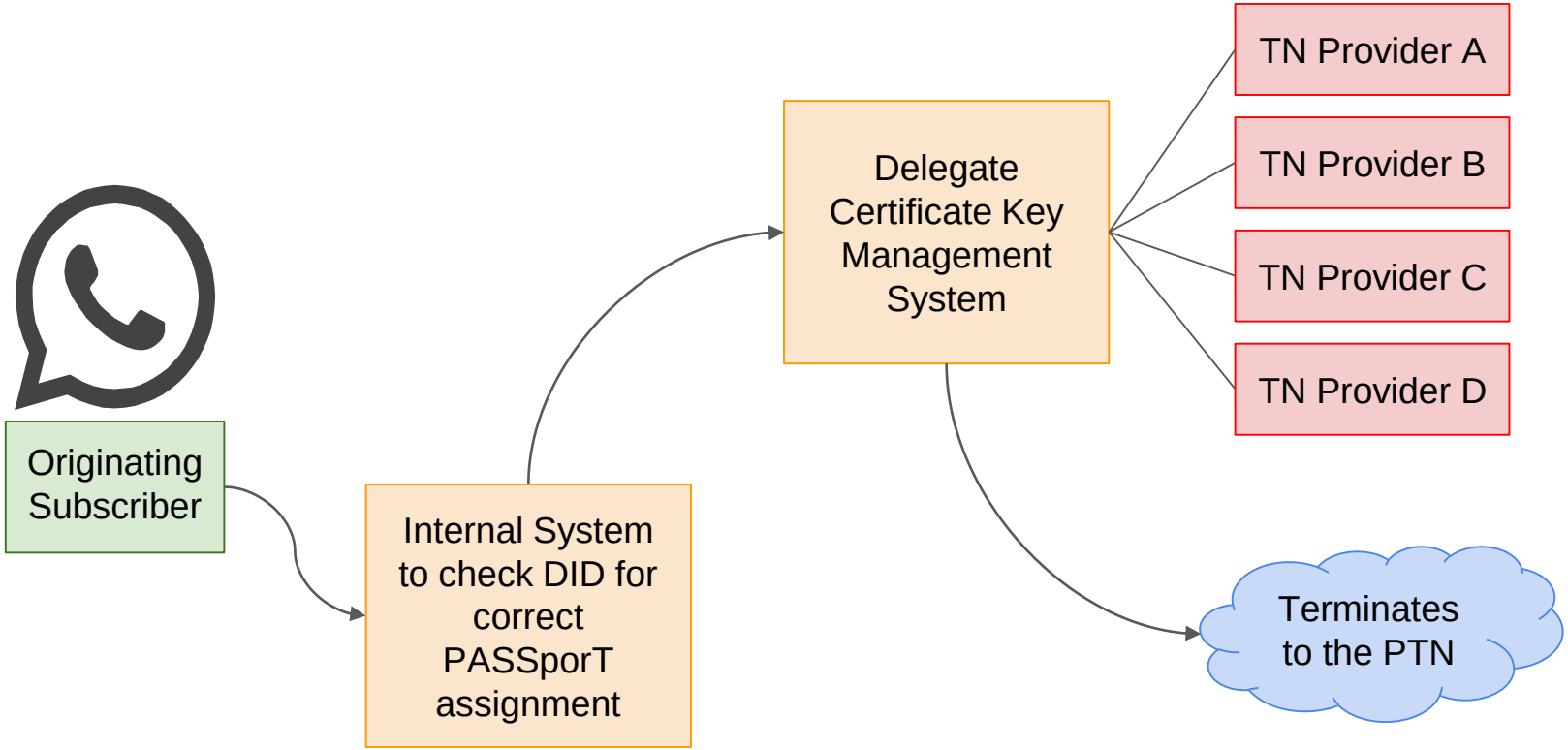
An end user originates a call from a number belonging to 3rd party provider



Overview of Enterprise Certificates

Overview of Enterprise Certificates

Enterprise Certificates are an alternative to Delegate Certificates.

Main features of this proposal:

- Expand the range of entities that can obtain STI certificates.
  - Include entities without SPIDs (enterprises, resellers, etc.).
- Avoid delegation.
  - STI-PA directly authorizes these entities to obtain certificates and participate in the SHAKEN framework; alternatively STI-CAs can be delegated this authority.
  - STI-CAs issue certificates to these entities.

Overview of Enterprise Certificates

Participants within the Enterprise Certificates framework.

TN Provider

Policy and management

- Authorized by PA.
- Certificate obtained from CA.
- Has SPID and numbering ranges.

Use of Certificate

- SP fully attests if Caller ID is authorized for use.
- SP can fully attest if caller is known and trusted.

Enterprise

Policy and management

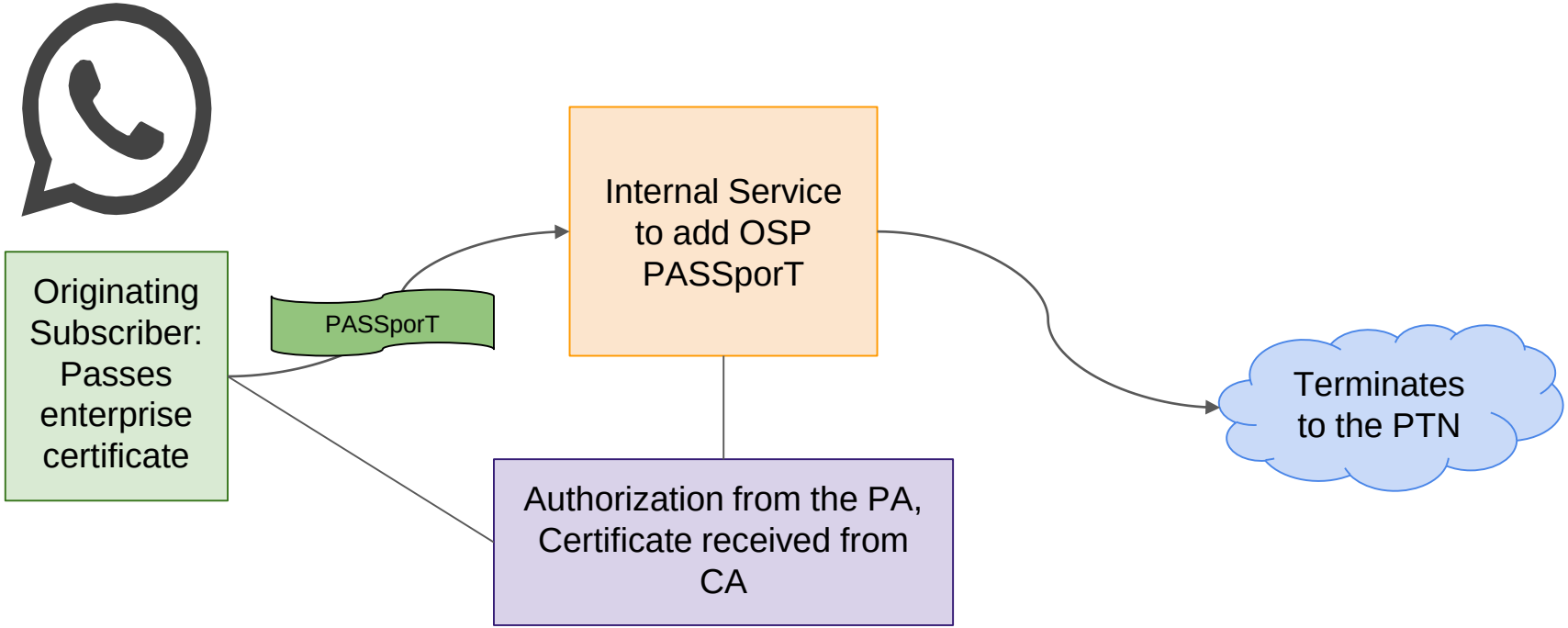
- Authorized by PA.
- Certificate obtained from CA.
- Does not necessarily have a SPID or numbering ranges, but is authorized to use some pool of numbers

Use of Certificate

- Enterprise asserts that Caller ID is authorized for use.
- Originating SP can pass enterprise PASSporT instead of adding its own PASSporT.

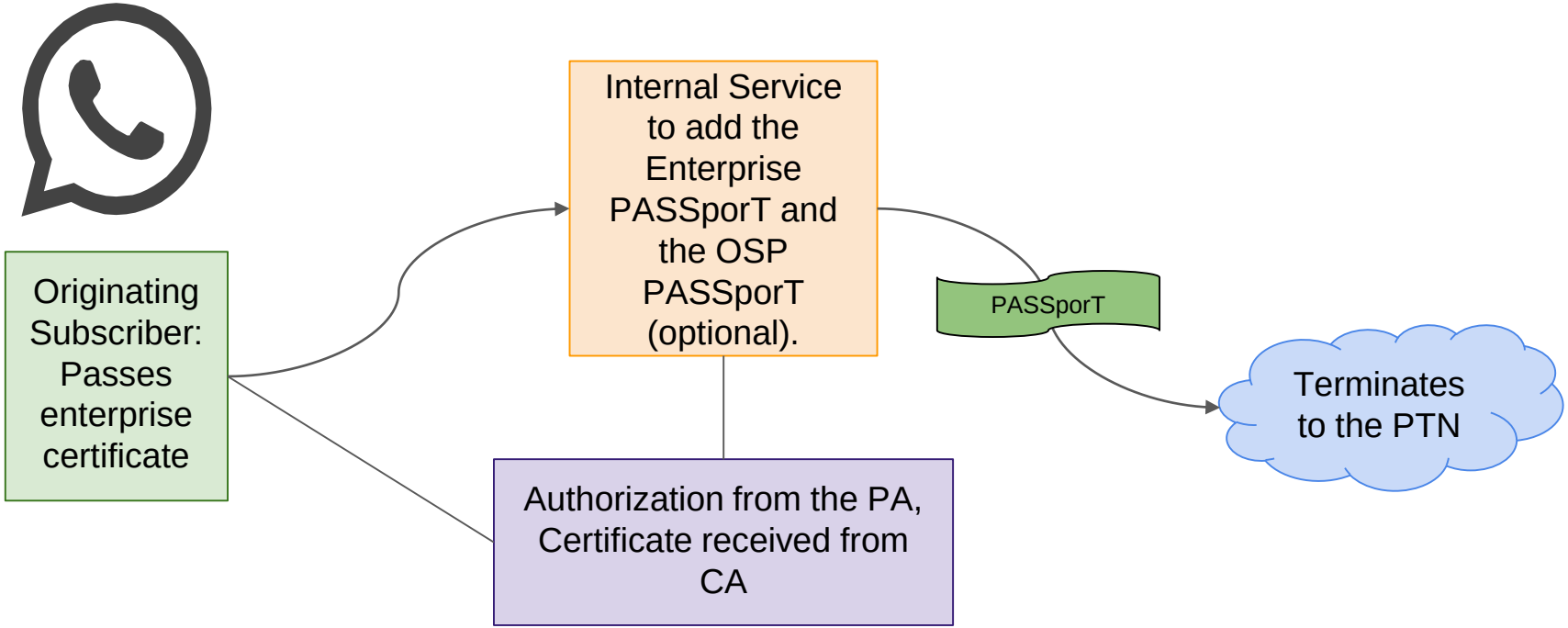
Workflows: Enterprise Certificates

An end user originates a call from a number belonging to either their OSP's owned block or a 3rd party numbering provider. An enterprise passes along their certificate.



Workflows: Enterprise Certificates

An end user originates a call from a number belonging to either their OSP's owned block or a 3rd party provider. In this scenario the enterprise has previously loaded their PASSporT into their OSP's platform.



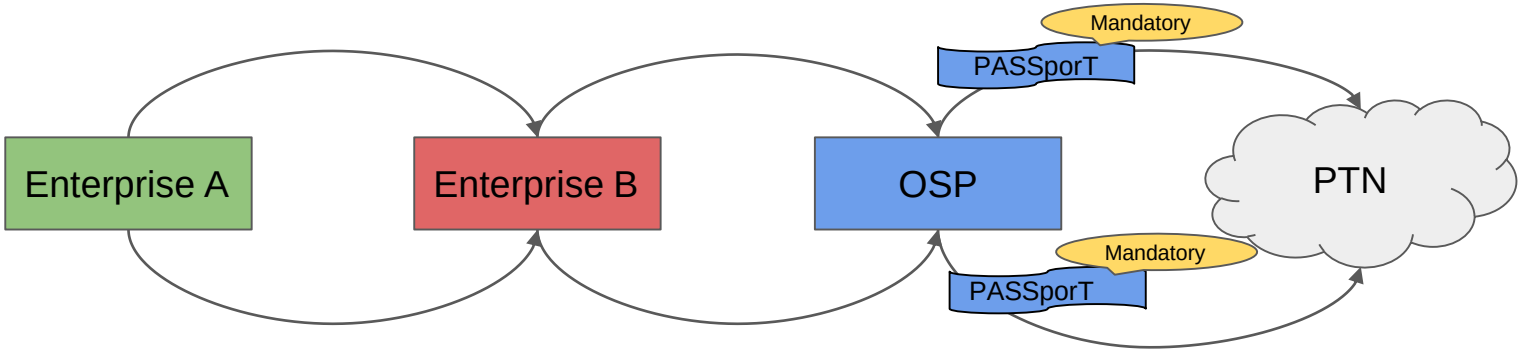
Scenarios

Scenarios

Scenario	Enterprise Caller PASSporT Provided?	Originating SP TN Association Verified?	Final PASSporT(s) / Attestation Level
A	Absent	Not verified	OSP PASSporT – Partial
B	Absent	Verified	OSP PASSporT – Full
C1	Present	Not verified	Enterprise PASSporT – Partial or Full
C2			Enterprise PASSporT – Partial or Full + OSP PASSporT – Partial
D1	Present	Verified	Enterprise PASSporT – Partial or Full
D2			Enterprise PASSporT – Partial or Full + OSP PASSporT – Full
D3			OSP PASSporT – Full

- Definition of OSP follows that in the Delegate Certificate proposal.
  In each of the above scenarios, the OSP has a direct relationship with the Enterprise.
- There could be multiple layers: There is a possibility that the Enterprise's customer, in turn, has a certificate that could be passed along.
  The same matrix above would work for sub-layers. The TSP is only responsible for unpacking the furthest upstream PASSporT.
- An OSP or a TN Provider could also act as a Enterprise; they would still only have 1 certificate.

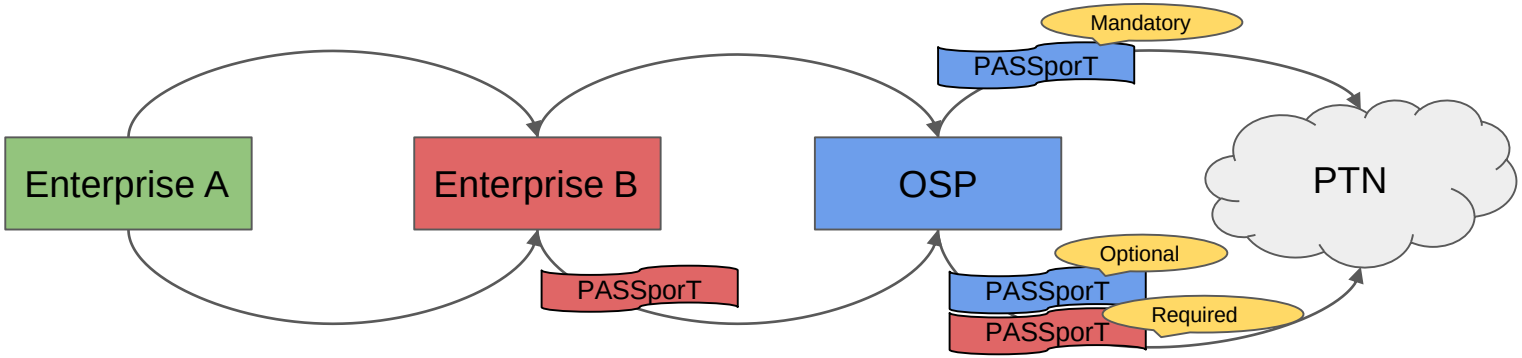
Plain STIR/SHAKEN



Enterprise Certificates: No upstream enterprises

- A PASSporT should be attached by the farthest upstream entity with a certificate. However, in this case no upstream entity has a certificate.
- Depending on customer information and use case, the OSP can do one of the following:
  - attach its own PASSporT, with partial attestation (A)
  - attach its own PASSporT, with full attestation (B)

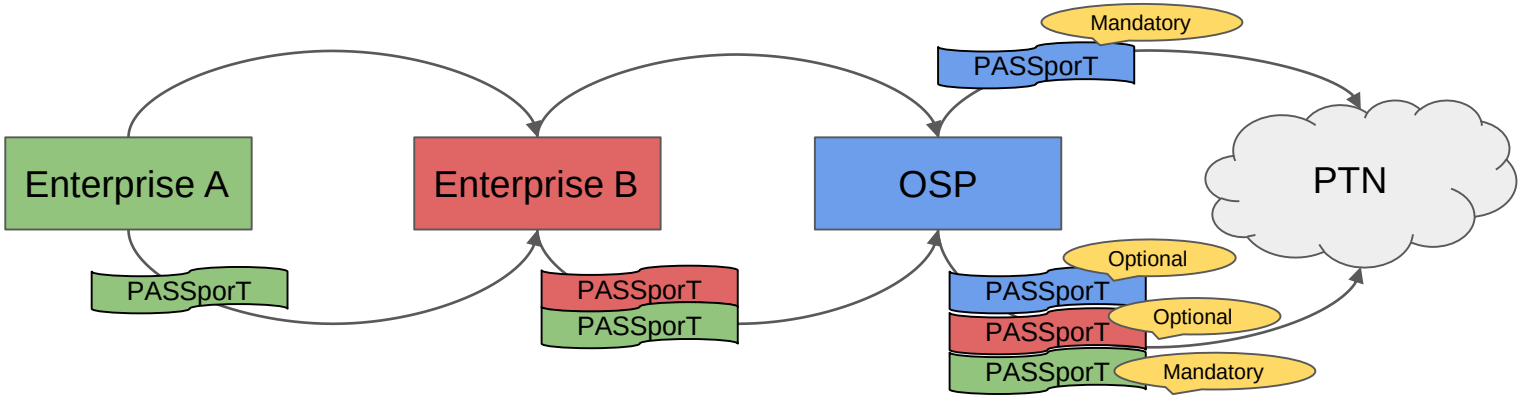
Plain STIR/SHAKEN



Enterprise Certificates: One upstream enterprise

- A PASSporT should be attached by the farthest upstream entity with a certificate.
- Depending on customer information and use case, the upstream provider prior to PTN origination has the following options:
  - pass along the received upstream PASSporT (C1, D1)
  - pass along its own PASSporT in addition to the received upstream PASSporT (C2, D2)
  - replace the received upstream PASSporT with its own PASSporT (D3)

Plain STIR/SHAKEN



Enterprise Certificates: Multiple upstream enterprises

- A PASSporT should be attached by the farthest upstream entity with a certificate.
- Depending on customer information and use case, each upstream provider prior to PTN origination has the following options:
  - pass along just the received upstream PASSporTs (C1, D1)
  - pass along its own PASSporT in addition to the received upstream PASSporTs (C2, D2)
  - replace the received upstream PASSporTs with its own PASSporT (D3)

Advantages of Enterprise Certificates

Advantages of Enterprise Certificates

Implications of Enterprise Certificates:
Responsibility is decentralized and put closer to the actual callers.

- Trust depends on entity reputation, not TN authorization lists.
- Entities have incentive to use their certificates appropriately.
  - Certificates and authorization can be revoked by the PA.
  - Obtaining certificates has a cost.
    - Define some set of criteria for eligibility.
    - Include non-negligible fees for authorization.
  - Certificates are connected to contact information: director names and contacts.
- Simpler traceback:
  - The same enterprise caller is identified by its PASSporTs, regardless of which service providers are used.
  - It is more difficult to create multiple entities and obtain PA authorization.